



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------|-------------|----------------------|---------------------|------------------|
| 10/576,132 | 12/18/2006 | Davide Caprioli | 27274U | 5480 |
| 20529 7590 10/14/2009 | | | | |
| THE NATH LAW GROUP | | | | |
| 112 South West Street | | | | |
| Alexandria, VA 22314 | | | | |
| EXAMINER | | | | |
| GUILL, RUSSELL | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2123 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 10/14/2009 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/576,132

Applicant(s)

CAPRIOLI, DAVIDE

Examiner

Russ Guill

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office action is a first Office action on the merits for application 10/576132. Claims 1 – 4 have been examined. Claims 1 – 4 have been rejected.

Claim Objections

2. Claim 1 is objected to because the claim recites in line 1, “CAE-method”. The first use of an abbreviation should be preceded by the full meaning of the abbreviation, with the abbreviation in parentheses.
3. Claim 1 is objected to because the claim recites in line 3, “comprising the following input steps to create input variables:”; however, the following steps do not appear to be input steps.
4. Claim 1 is objected to because the claim recites in line 34, “SPL”. The first use of an abbreviation should be preceded by the full meaning of the abbreviation, with the abbreviation in parentheses.
5. Claim 1 is objected to because the claim recites in line 41, “)””. The closing parenthesis does not appear to have an associated open parenthesis.
6. Claim 1 is objected to because the claim recites in line 42, “)””. The closing parenthesis does not appear to have an associated open parenthesis.
7. Claim 1 is objected to because the claim recites in line 46, “FEM”. The first use of an abbreviation should be preceded by the full meaning of the abbreviation, with the abbreviation in parentheses.
8. Claim 1 is objected to because the claim recites in line 48, “NVH”. The first use of an abbreviation should be preceded by the full meaning of the abbreviation, with the abbreviation in parentheses.

9. Regarding claims 1 - 4, the claims do not appear to be in standard U.S. claim format, which render the claims ambiguous. The clarity of the claims would benefit by amending the claims to be in standard U.S. claim format. An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1 - 4 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- a. An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.
- b. Regarding claim 1, the claim recites in lines 13, 20, 41, "etc.". The term is indefinite because it is unclear what additional elements are referred to. The metes and bounds of the claim cannot be determined.
- c. Regarding claim 1, the claim recites in line 18, "i.e.". The term is indefinite because the meaning of the term is unclear, and the elements of the claim that are being modified are also uncertain. The metes and bounds of the claim cannot be determined.

- d. Regarding claim 1, the claim recites in line 4, "the vehicle body". The term appears to have insufficient antecedent basis.
- e. Regarding claim 1, the claim recites in line 6, "its". The antecedent of the term is unclear. The metes and bounds of the claim cannot be determined.
- f. Regarding claim 1, the claim recites in line 7, "the body material characteristic data". The term appears to have insufficient antecedent basis.
- g. Regarding claim 1, the claim recites in line 9, "the above input variables". It is unclear which variables are "above input variables". The metes and bounds of the claim cannot be determined.
- h. Regarding claim 1, the claim recites in lines 34 - 35, "the passenger compartment". The term appears to have insufficient antecedent basis.
- i. Regarding claim 1, the claim recites in lines 43 - 44, "the vehicle body panel parameters". The term appears to have insufficient antecedent basis.
- j. Regarding claim 1, the claim recites in line 42, "these material properties". The term appears to have insufficient antecedent basis. The term does not appear to refer to the antecedent "equivalent material damping properties" because the equivalent material damping properties are computed from "these material properties".
- k. Regarding claim 2, the claim recites in line 3, "i.e.". The term is indefinite because the meaning of the term is unclear, and the elements of the claim that are being modified are also uncertain. The metes and bounds of the claim cannot be determined.
- l. Regarding claim 2, the claim recites in line 6, "the areas". The term appears to have insufficient antecedent basis.

- m. Regarding claim 2, the claim recites in line 7, "the surfaces". The term appears to have insufficient antecedent basis.
- n. Regarding claim 2, the claim recites in line 8, "the main dimensions". The term appears to have insufficient antecedent basis.
- o. Regarding claim 2, the claim recites in lines 8 - 9, "the shape change". The term appears to have insufficient antecedent basis.
- p. Regarding claim 2, the claim recites in line 10, "the damping layout". The term appears to have insufficient antecedent basis.
- q. Regarding claim 2, the claim recites in line 11, "the Equivalent Material properties". The term appears to have insufficient antecedent basis. The term does not appear to be the same as the previously recited "equivalent material damping properties".
- r. Regarding claim 2, the claim recites in line 12 - 13, "the corresponding computed Equivalent Material Properties". The term appears to have insufficient antecedent basis.
- s. Regarding claim 2, the claim recites in lines 14 - 15, "the corresponding shape layout modification". The term appears to have insufficient antecedent basis.
- t. Regarding claim 2, the claim recites in line 10, "defining per each areas". The meaning of the phrase is unclear. The metes and bounds of the claim cannot be determined.
- u. Regarding claim 3, the claim recites in line 4, "in particular in vibration and acoustic pressure". The meaning of the phrase is unclear because it is unclear what the phrase "in particular" refers to. The metes and bounds of the claim cannot be determined.

v. Regarding claim 4, the claim recites in line 3, "in particular in vibration and acoustic pressure". The meaning of the phrase is unclear because it is unclear what the phrase "in particular" refers to. The metes and bounds of the claim cannot be determined.

w. Regarding claim 1, the claim recites in line 42, "EMERALD". The term appears to be a trademark that renders the claim indefinite. The MPEP recites (2173.05(u)), " If the trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of the 35 U.S.C. 112, second paragraph. Ex parte Simpson, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. In fact, the value of a trademark would be lost to the extent that it became descriptive of a product, rather than used as an identification of a source or origin of a product. Thus, the use of a trademark or trade name in a claim to identify or describe a material or product would not only render a claim indefinite, but would also constitute an improper use of the trademark or trade name."

x. Regarding claim 1, the claim recites in line 47, "NASTRAN". The term appears to be a trademark that renders the claim indefinite.

y. Regarding claim 2, the claim recites in line 11, "Emerald". The term appears to be a trademark that renders the claim indefinite.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. § 103(a) are summarized as follows:

- a. Determining the scope and contents of the prior art.
- b. Ascertaining the differences between the prior art and the claims at issue.
- c. Resolving the level of ordinary skill in the pertinent art.
- d. Considering the objective evidence present in the application indicating obviousness or nonobviousness.

14. The claims have been rejected above under 35 USC § 112, second paragraph, as vague and indefinite. A claim interpretation would require considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims. Therefore the claims are treated below as best understood by the Examiner.

15. Claims 1 - 4 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Marburg (Steffen Marburg et al., "A general concept for design modification of shell meshes in structural-acoustic optimization - Part II: Application to a floor panel in sedan interior noise problems", June 2002, *Finite Elements in Analysis and Design*,

volume 38, issue 8, pages 737 - 754) in view of Iwasaki (Toshiki Iwasaki et al., "Optimal Design of Flat Structures for Vibration Suppression", September 2001, Proceedings of the 2001 IEEE International Conference on Control Applications, pages 583 - 587), further in view of Marcelin (J.L. Marcelin et al., "Optimal structural damping of skis using a genetic algorithm", 1995, Structural Optimization, volume 10, pages 67 - 70).

- a. The art of Marburg is directed to structural-acoustic optimization of a vehicle body (*page 737, Abstract, and page 739, section 2.1 "Simulation model"*).
- b. The art of Iwasaki is directed to optimal design of flat structures for vibration suppression (*page 583, Abstract*).
- c. The art of Marcelin is directed to optimal structural damping in skis (*page 67, Title and abstract and section 1 "Introduction"*).
- d. The art of Marburg and the art of Iwasaki are analogous art because they both pertain to vibration suppression optimization.
- e. The art of Marburg and the art of Marcelin are analogous art because they both pertain to vibration suppression optimization.
- f. The motivation to use the art of Iwasaki with the art of Marburg would have been the benefits recited in Iwasaki including a vibration reduction ratio of 26 percent (*page 587, section C. "Vibration suppression"*).
- g. The motivation to use the art of Marcelin with the art of Marburg would have been the benefits recited in Marcelin including that genetic algorithm is an efficient method able to optimize the factor of dampness, and the optimization of composite plates or shells can be easily performed (*page 70, section 4 "Conclusion"*).
- h. Regarding **claim 1**:
- i. Marburg appears to teach:

- j. generating a structural finite element (FE) model of the vehicle body on which damping has to be optimized (*page 739, section 2.1 "Simulation model"*);
- k. defining a plurality (N) of possible damping treatments and determining its material characteristic data as well as the body material characteristic data (*page 743, figure 3*);
- l. applying a genetic algorithm to the above input variables, which algorithm performs a selective iteration (*page 747, second paragraph, "It may be an alternative for this kind of optimization to use genetic algorithms"*) by:
 - m. generating further structural finite element (FE) model of the vehicle body comprising structural vehicle body frames and/or panels such as dash, floor or tunnel, on which damping has to be optimized (*page 737, section 1 "Literature review and problem explanation", first sentence*) and--in case that an acoustic target/SPL is required--generating a boundary element (BE) model of the passenger compartment (*page 740, third paragraph that starts with "The boundary element model ..."*; *page 737, section 1 "Literature review and problem explanation", first sentence*);
 - n. defining damping patches potentially subject to possible treatment (*page 740, figure 1, lower right quadrant, "modification domain"*);
 - o. defining the plurality (N) of possible damping treatments by including no treatment (*page 744, figure 4, portions of the design are left untreated*); and further comprising the following computing steps:
- p. ~~Computing the equivalent material damping properties, in particular the overall thickness, weight, porosity, bending stiffness, elongation stiffness, bonding loss factor, elongation loss factor, visco elasticity, temperature, etc.) by multi-layer simulation, for instance by EMERALD, from these material properties for each combination of any of the plurality of the possible damping treatments with any of the vehicle body panel parameters (pages 739 - 740, section 2.1~~

~~"Simulation model"), including the temperature and frequency dependency of all materials involved;~~

q. running a FEM simulation, a finite element model simulation, such as NASTRAN, for a reference configuration in order to calculate the dynamic response in the frequency domain (in particular by using the NVH response transfer function), in particular the vibration behaviour of the vehicle on which damping has to be optimised with respect to excitation, architecture/structure and used materials (*page 741, section 2.2 "Noise transfer function"*).

r. Marburg does not specifically teach:

- i. a) generating a pool of individuals (damping packages/treatment configuration, coded by a binary string) from the input variables (equivalent material damping properties, spatial distribution, thickness, weight, etc. of the binary string);
- ii. b) mutating (bit change for an individual) and/or crossing (exchange of bit sequences) randomly selected individuals/genes of this pool by means of genetic statistic operators to generate a new generation of individuals/genes;
- iii. c) selecting each individual of the new generation by means of a statistical selection according to a defined objective function (OF), i.e. calculating the value of a predetermined fitness/priority criterium/predefined targets (lower weight, lower vibration, lower sound pressure level, lower cost, etc./objective function);
- iv. d) correlating individual's chance of mutating and/or crossing with their performance with respect to the objective function; e) mutating and/or crossing these chance-correlated individuals by means of genetic statistic operators to generate a next new generation of individuals;

- v. f) iterating steps c), d) and e) until a predetermined flattening of the slope of the OF versus the number of performed generations is achieved, which leads to a set of optimised vibration damping configurations,
- s. Computing the equivalent material damping properties, in particular the overall thickness, weight, porosity, bending-stiffness, elongation stiffness, bending loss factor, elongation loss factor, visco-elasticity, temperature, etc.) by multi-layer simulation, for instance by EMERALD), from these material properties for each combination of any of the plurality of the possible damping treatments with any of the ~~vehicle body panel parameters~~, including the temperature and frequency dependency of all materials involved;
- t. Iwasaki appears to teach:
 - i. a) generating a pool of individuals (damping packages/treatment configuration, coded by a binary string) from the input variables (equivalent material damping properties, spatial distribution, thickness, weight, etc. of the binary string) (*page 585, section IV "Optimization by genetic algorithm"*);
 - ii. b) mutating (bit change for an individual) and/or crossing (exchange of bit sequences) randomly selected individuals/genes of this pool by means of genetic statistic operators to generate a new generation of individuals/genes (*page 585, section IV "Optimization by genetic algorithm"*);
 - iii. c) selecting each individual of the new generation by means of a statistical selection according to a defined objective function (OF), i.e. calculating the value of a predetermined fitness/priority criterion/predefined targets (lower weight, lower vibration, lower sound pressure level, lower cost, etc./objective function) (*page 585, section IV "Optimization by genetic algorithm"*);

- iv. d) correlating individual's chance of mutating and/or crossing with their performance with respect to the objective function; e) mutating and/or crossing these chance-correlated individuals by means of genetic statistic operators to generate a next new generation of individuals (*page 585, section IV "Optimization by genetic algorithm"*);
- v. f) iterating steps c), d) and e) until a predetermined flattening of the slope of the OF versus the number of performed generations is achieved, which leads to a set of optimised vibration damping configurations (*page 585, section IV "Optimization by genetic algorithm"; see also Marburg, page 747, lines 8 - 10*),
- u. Marcelin appears to teach:
- v. Computing the equivalent material damping properties, in particular the overall thickness, weight, porosity, bending-stiffness, elongation stiffness, bending loss factor, elongation loss factor, visco-elasticity, temperature, etc.) by multi-layer simulation, for instance by EMERALD), from these material properties for each combination of any of the plurality of the possible damping treatments with any of the ~~vehicle body panel~~ parameters, including the temperature and frequency dependency of all materials involved (*pages 68 - 69, section 3 "Optimization of the stacking sequence in a ski", and table 1*);
- w. Obviousness must be determined in light of the knowledge of the ordinary artisan. Prior art is not limited just to the references being applied, but includes the understanding of one of ordinary skill in the art. The following references teach knowledge of the ordinary artisan at the time of invention.
- i. Alain Ratle et al., "Use of genetic algorithms for the vibroacoustic optimization of a plate carrying point-masses", 1998, J. Acoust. Soc. Am., volume 104, number 6, pages 3385 - 3397; teaches genetic algorithms to perform vibration damping of a structure.

- ii. George A. Borlase et al., "An energy finite element optimization process for reducing high-frequency vibration in large-scale structures", 2000, Finite Elements in Analysis and Design, volume 36, pages 51 - 67; teaches optimization for vibration damping and damping treatments.
- x. The MPEP recites in section 2121.01:
 - i. A reference contains an "enabling disclosure" if the public was in possession of the claimed invention before the date of invention. "Such possession is effected if one of ordinary skill in the art could have combined the publication's description of the invention with his [or her] own knowledge to make the claimed invention." *In re Donohue*, 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985).
 - y. The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See *In re Kahn*, 441 F.3d at 987-88; *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991); and *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Moreover, in evaluating such references it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968).
 - z. The "mere existence of differences between the prior art and an invention does not establish the invention's nonobviousness." *Dann v. Johnston*, 425 U.S. 219, 230, 189 USPQ 257, 261 (1976). The gap between the prior art and the claimed invention may not be "so great as to render the [claim] nonobvious to one reasonably skilled in the art." *Id.* A prior art reference must be considered together with the knowledge of one of ordinary skill in the pertinent art. A reference need not explain every detail since it is speaking to those skilled in the art. *In re Paulsen* 31 USPQ2d 1671.
 - aa. Therefore, as discussed above, it would have been obvious to the ordinary artisan at the time of invention to use the art of Marcelin and the art of Iwasaki with the art of Marburg to produce the claimed invention.
- bb. Regarding **claim 2**:

cc. Marburg appears to teach:

dd. defining the areas where a damping treatment is to be applied (*page 740, figure 1, lower right quadrant, "modification domain"*);

ee. defining the surfaces where a shape modification can be performed, and identification of the main dimensions of the geometrical layout of the shape change (*page 740, figure 1, lower right quadrant, "modification domain"*);

ff. ~~automatically updating each panel/area of the FE model (page 745, figure 5) with the corresponding computed Equivalent Material Properties;~~

gg. automatically updating each surfaces with the corresponding shape layout modification (*page 745, figure 5*).

hh. Marburg does not specifically teach:

ii. defining per each areas of the damping layout and temperature conditions and evaluating of the Equivalent Material properties through Emerald;

jj. ~~automatically updating each panel/area of the FE model with the corresponding computed Equivalent Material Properties;~~

kk. Marcelin appears to teach:

ll. defining per each areas of the damping layout and temperature conditions and evaluating of the Equivalent Material properties through Emerald (*pages 67 - 68*);

mm. ~~automatically updating each panel/area of the FE model with the corresponding computed Equivalent Material Properties (pages 67 - 68);~~

nn. Regarding **claims 3, 4:**

oo. Marburg appears to teach:

pp. defining additional constraints or objectives in terms of weight and noise vibration harsh (NVH) performance, in particular in vibration and acoustic pressure (*page 747, third paragraph and below*).

16. **Examiner's Note:** Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the Applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner. The entire reference is considered to provide disclosure relating to the claimed invention.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russ Guill whose telephone number is 571-272-7955. The examiner can normally be reached on Monday – Friday 9:30 AM – 6:00 PM.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any inquiry of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist: 571-272-2100.

19. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Russ Guill
Examiner
Art Unit 2123

RG

/Paul L Rodriguez/

Supervisory Patent Examiner, Art Unit 2123